EM300 PRACTICE PROBLEMS (CH1 AND CH2)

1. What are the specific volume [ft³/lb$_m$] and the specific weight [lb$_f$/ft³] of seawater?
Bonus: what is the specific gravity of seawater?

HINT: $v = \frac{1}{\rho}$

$\gamma = \rho \left(\frac{g}{g_c} \right)$

S.G. $= \frac{\rho_{sw}}{\rho_{H_2O}}$

ANS: $v = 0.0156 \frac{FT^3}{LBm}$

$\gamma = 64 \frac{LBf}{FT^3}$

S.G. $= 1.026$

2. If the barometric pressure is 14.7 psia, what is the total pressure on a submarine hull at a depth of 400 ft in seawater?

HINT: $P_{TOT} = P_{ATM} + P_{DEPTH}$

ANS: $P_{TOT} = 192.5 \ PSIA$

3. A pressure gage reads 10.183 in Hg <u>vacuum</u> and the barometer reads 407.2 in H$_2$O. What is the absolute pressure in [psia]?

HINT: $P_{ABS} = P_{ATM} + P_{GAGE}$

ANS: $P_{ABS} = 9.7 \ PSIA$

4. When 5 Btu of heat is added to a system, 3 Btu of heat is rejected. What is the net work [ft lb$_f$] of the system? Hint: Use the First Law of Thermodynamics.

HINT: $\Sigma Q = \Sigma W$
  - USE HOW IN CONVENTION

ANS: $W_{NET} = 1556 \ FT \ LBf$